

SYNOPSIS OF *HELIANTHUS GIGANTEUS* L.
AND RELATED SPECIES

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THIS report is based upon a recently completed investigation of the perennial sunflower *Helianthus giganteus* L. and morphologically related species (Long, 1954). Since it will be some time before the entire work is published, a synopsis of the revised taxonomy of the group seems desirable.

Simply stated, this section (tentatively called, the "giganteus section") of the genus includes those perennial sunflowers that are characterized by lanceolate leaves, the uppermost alternate and not conspicuously three-veined, with showy heads and narrow, attenuate phyllaries. Components of this group are widely distributed over North America, including practically all of the United States. The largest number of species is found in the western part of the Great Lakes region. They are frequently encountered as weeds in the fall flora of many states.¹

1. *H. NUTTALLII* TORREY AND GRAY, Fl. N. A. 2: 324. 1842.

KEY TO SUBSPECIES

- A. Leaves 1.0–2.5 cm. wide, generally 10.0–15.0 cm. long; margins entire, obscurely serrate, or serrulate; phyllaries 1.0–1.2 cm. long; uppermost leaves reduced, linear-lanceolate; Nebraska, South Dakota to Alberta, south to Nevada, and Colorado. *H. Nuttallii*, ssp. *Nuttallii* 1a.
- AA. Leaves 2.5–4.0 cm. wide, generally 12.0–20.0 cm. long; margins often distinctly serrate; uppermost leaves not greatly reduced, lanceolate; phyllaries mostly 1.0–1.5 cm. long, variable; Colorado and Wyoming, Idaho, Utah, and New Mexico. *H. Nuttallii* ssp. *coloradensis* 1b.

1a. *H. NUTTALLII* T. & G., ssp. *NUTTALLII*.

H. giganteus, var. *utahensis* D. C. Eaton, Bot. King Exp. 169. 1871.

H. californicus, var. *utahensis* Gray, Syn. Fl. 2: 277. 1884.

H. fascicularis Greene, Pl. Bak. 3: 28. 1901.

H. utahensis A. Nels., Bull. Torrey Bot. Cl. 29: 405. 1902.

Type.—*H. californicus* Nutt. (not DC.). The type is presumably in Nuttall's collection at the Academy of Natural Sciences of Philadelphia.

¹ I am grateful, for the loan of herbarium specimens for study and comparison, to the directors or curators of the following herbaria: Stanford University; University of Georgia; Chicago Museum of Natural History; Gray Herbarium; Missouri Botanical Garden; University of Nebraska; Michigan State College; State College of Agriculture of the University of North Carolina; New York Botanical Garden; Academy of Natural Sciences of Philadelphia; Rocky Mountain Herbarium; University of Texas; and West Virginia University.

1b. *H. NUTTALLII*, ssp. **coloradensis** (Ckll.) Long, stat. nov.

H. coloradensis Cockerell Proc. Biol. Soc. Washington **27**: 6. 1914.

H. Parishii Gray var. *coloradensis* Cockerell Torrey **18**: 181. 1918.

Type.—*H. coloradensis* Cockerell, type 1; collected by T. D. A. Cockerell few miles east of Boulder, Colorado; supposedly in the U. S. National Museum.

2. *H. PARISHII* Gray, Proc. Am. Acad. **19**: 7. 1883.

H. californicus DC., var. *Parishii* (Gray) Jepson, Man. Fl. Pl. Calif. 1923.

Type.—*S. Parish* 11125, from borders of streams and wet plains, San Bernardino, California; in the Gray Herbarium.

3. *H. GROSSESERRATUS* Martens, Sel. Sem. Hort.
Lov. ex Linnaea XIV Litt. 133, 1839.

KEY TO SUBSPECIES

- A. Leaves lanceolate, generally broadest near middle; margins serrate, teeth not exceeding 0.2–0.3 cm. long, usually more or less equal in size and regularly spaced; Massachusetts and New Hampshire, Wisconsin, Texas, and Kentucky. *H. grosseserratus*, ssp. *grosseserratus* 3a.
- AA. Leaves lanceolate-ovate, generally broadest near base; margins conspicuously sharply and deeply serrate, teeth 0.3–0.6 cm. long, frequently unequal in size and irregularly spaced; Michigan to Minnesota, Nebraska, Iowa, and Texas. *H. grosseserratus*, ssp. *maximus* 3b.

3a. *H. GROSSESERRATUS* Martens, ssp. **GROSSESERRATUS**.

H. grosseserratus β Torrey and Gray, Fl. N. A. Vol. II. 1841.

H. grosseserratus α Torrey and Gray, l. c.

H. grosseserratus f. *pleniflorus* Wadmond, Rhodora **34**: 19. 1932.

H. instabilis E. Watson, Papers Mich. Acad. Sci. **9**: 423 Pl. 65, 1929. (in part, including type).

TYPE: The location of the type is unknown.

3b. *H. GROSSESERRATUS* Martens, ssp. **maximus** Long, ssp. nov.

A typo differt margine foliorum caulicorum irregulariter et profunde serrata, dentata 0.3–0.6 cm.

Type.—*H. C. Reynolds* 2643, Preston, Richardson County, Nebraska, October 5, 1940. In the herbarium of the University of Nebraska. No. 43244.

4. *H. CALIFORNICUS* DC., Prod. **5**: 599. 1836.

H. californicus var. *mariposianus* Gray, Synoptical Fl. N. A. Vol. I, Part 2. 1884.

Type.—A collection by Douglas from California, deposited at Kew.

5. *H.* × **KELLERMANI** Britton, pro. sp.
(*grosseserratus* × *salicifolius*)

H. Kellermani Britton, Man. 994. 1901.

Type.—*W. Kellerman*, collected near fairgrounds, Columbus, Ohio, September 5, 1898; deposited in the Gray Herbarium.

6. *H.* **RYDBERGII** Britton. Man. 993. 1901.

Type.—*Rydberg 1767*, Hooker County, Nebraska; in the herbarium of the New York Botanical Garden. A co-type is deposited in the Herbarium of the University of Nebraska, No. 10633.

7. *H.* × **divariserratus** Long, hyb. nov.

H. giganteus var. *ambiguus* Torrey and Gray, Fl. N. A. II. 1841.
(in part, excluding type)

H. ambiguus (T. & G.) Britton, Man. 993. 1901 (in part, excluding type).

TYPE:—*E. Watson 344*, Danbury, Fairfield County, Connecticut, Aug. 8, 1924; in the herbarium of Michigan State College, no. 127020.

Stem 0.5–0.8 m. high, glabrous or with scattered hairs near the top, glaucous. *Leaves* broadly lanceolate, 6.9–10.0 cm. long, maximum width near the base; short, distinct petioles, usually 0.5–1.0 cm. long; opposite, sometimes alternate near the top; tapering to apex, more rounded to base; margins obscurely to distinctly serrate; undersurfaces with many, short hairs; rather strongly three-veined. *Phyllaries* 1.0–1.5 cm. long, variable; surfaces glabrous or puberulent; marginal cilia short. Heads in terminal raceme or reduced panicle. Connecticut to Michigan, Indiana. In moderately dry places.

Hybrida media inter *H. grosseserratum* et *H. divaricatum*; caulis glabris, foliis oppositis, aliquatenus trinervis, cum petiolis distinctis.

8. *H.* **GIGANTEUS** L., Sp. Pl. 905. 1753.

A. Leaves sessile, or with very short petioles, 0.1–0.8 cm. long; undersurfaces with short hairs; phyllaries usually conspicuously long-ciliate, surfaces occasionally subglabrous; Massachusetts and Connecticut, Minnesota, Illinois, Delaware. *H. giganteus* ssp. *giganteus* 8a.

AA. Leaves with petioles, commonly 0.8–1.2 cm. long; undersurfaces usually with rather abundant, spreading hairs; phyllaries short-ciliate, surfaces generally short-pubescent; Delaware, West Virginia, Georgia, and Kentucky. *H. giganteus* ssp. *alienus* 8b.

8a. *H.* **GIGANTEUS** L. ssp. **GIGANTEUS**.

H. altissimus L., Sp. Pl. Ed. 2, 1278. 1763.

H. virgatus Lam., Encyc. 3: 85. 1789.

H. gigas Michx., Fl. II, 141. 1803.

H. crinitus Nutt. fide Steud., Nomen. Ed. 2, 737. 1840.

H. tuberosus Parry, Owen, Rep. Minn. Survey 615. 1849.

H. giganteus var. *altissimus* (L.) Farwell, Rept. Mich. Acad. Sci. 180. 1915.

H. giganteus var. *oppositifolius* Farwell, Rep. Mich. Acad. Sci. **17**: 180. 1917.

H. giganteus var. *verticillatus* Farwell, Amer. Midl. Nat. **10**: 218. 1927.

H. giganteus var. *resiniferus* Farwell, Amer. Midl. Nat. **10**: 218. 1927.

H. borealis E. Watson, Pap. Mich. Acad. **9**: 411, Pl. 63. 1929 (in part, excluding type).

H. luxurians E. Watson, Pap. Mich. Acad. **9**: 464, Pl. 85, 86. 1929 (in part, excluding type).

Type.—Deposited in the Linnaean Herbarium, London, England.

8b. *H. GIGANTEUS* L. ssp. **alienus** (Watson) Long, stat. nov.

H. alienus Watson, Pap. Mich. Acad. Sci. **9**: 406, Pl. 60. 1929.

Type.—*H. alienus* E. Watson, Biltmore Herbarium, No. 2482-a, Missouri Botanical Garden Herbarium No. 113903; collected in moist soil near Biltmore, Buncombe County, North Carolina, September 12, 1898.

9. *H.* × **intermedius** Long, hyb. nov.

Stem stout, with rather abundant, short, white hairs, scabrous towards top; variable in color, green mottled, light-red, light-brown, or yellow; often glaucous. *Leaves* lanceolate, gradually acuminate to both apex and base; petioles short, 0.5–1.5 cm. long; margins shallowly serrate, sometimes irregularly or only obscurely toothed; lower surfaces with abundant, short hairs; slightly conduplicate; light-green to gray-green in color. *Phyllaries* variable, usually with short, white, marginal cilia and scattered pubescence over surface. Ohio and Michigan, Minnesota, south to Texas.

Hybrida inter *H. grosseserratum* et *H. Maximilianum*, caule breve pubescentibus, foliis serratis cum petiolis brevibus, phyllariis subpubescentibus.

Type.—*J. H. Schuette 9a5670*, Green Bay, Brown County, Wisconsin, "railroad tracks to Murphy's Mill," July 20, 1896; in the Chicago Museum of Natural History, No. 377645.

10. *H.* × **LUXURIANS** Watson, pro. sp.

(*giganteus* × *grosseserratus*)

H. borealis E. Watson, Pap. Mich. Acad. Sci. **9**: 411, Pl. 63. 1929 (in part, including type).

H. instabilis E. Watson, Pap. Mich. Acad. Sci. **9**: 423, Pl. 65. 1929 (in part, excluding type).

H. luxurians E. Watson, Pap. Mich. Acad. Sci. **9**: 464, Pls. 85, 86. 1929 (in part, including type).

H. membranaceus E. Watson, Pap. Mich. Acad. Sci. **9**: 438, Pl. 69. 1929 (including type).

Type.—*H. luxurians* E. Watson; *Watson 387*, near Cedar Point, Erie County, Ohio; growing in wet, black muck of an open field, September 21, 1924. Deposited in the Herbarium of Michigan State College, No. 126951.

11. *H. MAXIMILIANI* Schrader, Ind. Sem.
Hort. Götting. 1835.

H. subtuberosus Bourgeau, in herb. Hook., in Royal Bot. Gard. Kew, England. 1803.

H. Dalyi Britton, Jour. N. Y. Bot. Gard. **2**: 84. 1901.

H. Maximiliani var. *iubaris* Lunell, Amer. Midl. Nat. **5**: 63. 1917.

H. Maximiliani var. *paniculata* Farwell, Pap. Mich. Acad. Sci. **3**: 107. 1924.

H. Maximiliani f. *pallidus* Clute, Am. Bot. **36**: 17. 1930.

Type.—Exact location of type unknown. Watson (l. c.) believes it is probably in the Herbarium of the University of Göttingen, Germany.

12. *H. × FILIFORMIS* Small, pro. sp.
(*Maximiliani* × *salicifolius*)

H. filiformis Small, Fl. S. E. U. S. 1265. 1903.

Type.—*H. filiformis* Small, Reverchon 1635, Texas; in the New York Botanical Garden.

13. *H. × AMBIGUUS* T. & G., pro. var.
(*giganteus* × *divaricatus*)

H. giganteus var. *ambiguus* Torrey and Gray, Fl. N. A. II. 1842 (in part, including type).

H. ambiguus (T. & G.) Britton, Man. 993. 1901.

Type.—*H. ambiguus* (T. & G.) Britton; in the Herbarium of the New York Botanical Garden.

Other Possible Members of the "Giganteus" Section

The following list of names is considered to apply to populations closely allied to the "giganteus" section. However, none has been studied sufficiently to determine its exact status or relationships to other sunflowers. Most of the names may prove to be referable to previously described taxa.

1. *H. attenuatus* Watson, Pap. Mich. Acad. Sci. **9**: 416, Pl. 64, 1929. Type.—A. Fendler, "cult. ex. sem. New Mexico," October 16, 1852; in the Herbarium of the Missouri Botanical Garden, No. 113942.

2. *H. bracteatus* Watson, Pap. Mich. Acad. Sci. **9**: 393, Pl. 53. 1929. Type.—A. Isabel Mulford 177, Logan, Utah. In the Herbarium of the Missouri Botanical Garden, No. 113971.

3. *H. Cusickii* Gray, Proc. Am. Acad. **21**: 413. 1886. Type.—*Cusick*, dry hills near Malheur River, southeastern Oregon; in the Gray Herbarium.

4. *H. exasperatus* Watson, Pap. Mich. Acad. Sci. **9**: 455, Pl. 80. 1929. Type.—J. Schuette, Brown County, Wisconsin, September 13, 1886; Herbarium of Chicago Museum of Natural History, No. 377704.

5. *H. Oliveri* Gray, Proc. Am. Acad. **20**: 299. 1885. Type.—*J. Oliver*, Cienega, between Los Angeles and Santa Monica, California; in the Gray Herbarium.

The status of *H. attenuatus*, *H. bracteatus*, and *H. exasperatus* is especially questionable. *Helianthus exasperatus* appears to be a hybrid, with one of the parents being *H. giganteus*.—OHIO WESLEYAN UNIVERSITY DELAWARE, OHIO.

LITERATURE CITED

- LONG, ROBERT W. JR. 1954. A biosystematic investigation of *Helianthus giganteus* L. and related species. Ph.D. thesis. Library, Indiana University.
- WATSON, E. E. 1929. Contributions to a monograph of the genus *Helianthus*. Pap. Mich. Acad., **9**: 305–475.

CYPRIPEDIUM ARIETINUM R. BR. IN NOVA SCOTIA.—About one-quarter of a mile south of the southern end of the Wentworth gypsum quarries in Hants County, several clumps of *Cypripedium arietinum* R. Br. were found growing in broken country of gypsum sinkholes and thin poplar scrub. The plants were in full flower on the 24th of May, while the neighboring *Cypripedium calceolus* L. var. *parviflorum* (Salisb.) Fern. was still in small bud. It is probable that the extension of the quarries will destroy this area within a few years.

The present find would be merely another range extension of minor interest but for the fact that this is the fourth species to be found in these few acres of undisturbed gypsum and known from no other part of Nova Scotia. The others are: *Viola canadensis* L. (Roland: Flora of Nova Scotia); *Dirca palustris* L. (Erskine, J. S.: RHODORA **55**: 18); *Aloina rigida* (Hedw.) Kindb., a moss collected by W. B. Schofield and the author. Its identity was confirmed by Dr. A. L. Andrews. The northern limit of all four species is roughly the same, from the north of Lake Superior eastward to Massachusetts, with the exception of an unrecorded collection of *Aloina* from the Hudson Bay region. This distribution suggests that these four species survived just south of the Wisconsin ice-sheet and pushed north in a warm and favorable spell while the destroyed land was still unforested. Our cliff-floras, however, contain many northern plants which could hardly have come in from the south at this time. The assumption that an incomplete glaciation of Nova Scotia and neighboring areas existed during the late Wisconsin